

WHAT IS CLAIMED IS:

1. A process for the continuous production of polyurethane foam from at least one polyol component and at least one isocyanate component in the presence of water as a blowing agent and optionally further additives, comprising the steps of:
metering into a mixing chamber of a mixing unit and mixing therein at pressures of from about 3 to about 200 bar to form a polyurethane reaction mixture, the at least one polyol component, the at least one isocyanate component, the water and optionally the further additives;
generating bubble nuclei in the polyurethane reaction mixture by atomization thereof in a pressure-reduction body at pressures of from about 3 to about 200 bar, wherein the pressure is adjusted in the direction of flow downstream of the pressure-reduction body by a throttle body;
causing the polyurethane reaction mixture containing bubble nuclei to flow out through the throttle body; and
applying the polyurethane reaction mixture containing bubble nuclei to a substrate for foaming and curing.
2. The process according to claim 1, wherein the mixing in the mixing chamber is performed at pressures of from about 5 to 200 bar and wherein the atomization is performed at pressures of from 5 to 200 bar.
3. The process according to Claim 1, wherein the mixing unit is selected from the group consisting of stirrer-type mixers, static mixing elements and combinations thereof.
4. The process according to Claim 1, wherein the pressure-reduction body comprises one or more nozzles or orifices.

5. The process according to Claim 4, wherein the cross-sectional area of the one or more nozzles or orifices openings is adjustable.
- 5 6. The process according to Claim 1, wherein the throttle body comprises a diaphragm valve or pinch valve.
7. The process according to Claim 1, wherein the maximum pressure between the pressure-reduction body and the throttle body is about 20 bar.
- 10 8. The process according to Claim 1, wherein at least one bubble nucleating agent is dissolved in the polyol component and/or the isocyanate component in the mixing chamber before the mixing.
- 15 9. The process according to Claim 1, wherein at least one bubble nucleating agent is injected into the mixing chamber and is dissolved there.
- 20 10. In an apparatus for the continuous production of polyurethane foam, comprising a mixing unit having a mixing chamber and supply lines for the reaction components and a discharge opening for the polyurethane reaction mixture, the improvement comprising connecting a pressure-reduction body to the discharge opening and arranging an adjustable throttle body in the direction of flow downstream of the pressure-reduction body.